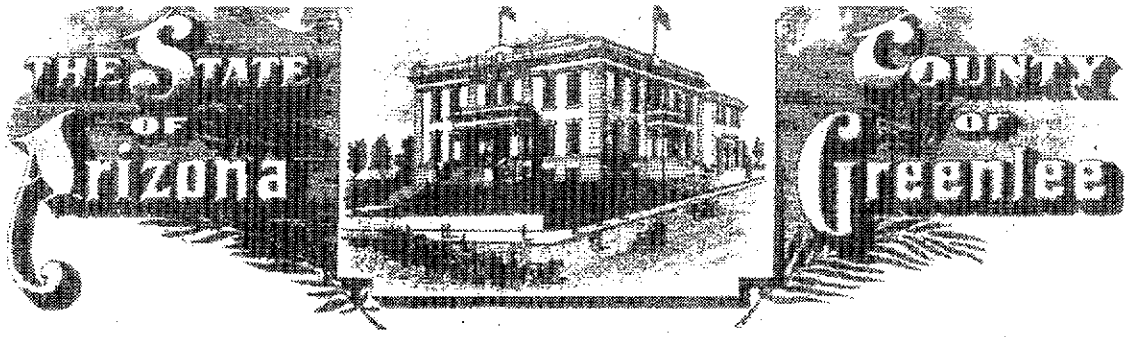

Greenlee County Airport Master Plan

(2000-2020)

Chapter 3
Aviation Demand Forcast
June, 2002

Stantec

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AVIATION DEMAND FORECASTS

Introduction

The purpose of this chapter is to provide forecasts of aviation demand for Greenlee County Airport (CFT) at key intervals during the 20-year planning period. The planning period for this update is divided into short-term (current to 2005), medium-term (2006 to 2010), and long-term (2011 to 2020) periods. These will serve as the basis for planning future facilities to accommodate the area's aviation needs through the year 2020.

The objective of forecasting is to provide a measure of aviation demand changes by which effects can be estimated and preparations can be made to accommodate the resulting conditions at the airport in an efficient and cost-effective manner. These forecasts include Greenlee County Airport's based aircraft, aircraft operations, fleet mix, and peaking characteristics through the planning period (2020).

This chapter presents activity levels actually experienced and determines aviation activity forecast through 2020. Further, the Greenlee County Airport demand forecasts are intended to update the previous1993 Master Plan forecasts. Because aviation activity can be affected by many influences at the local, regional, and national level, it is important to note that the activity forecasts in this chapter are used only as guidelines for the formation of a long-term development program for the airport. Implementation of recommended future facilities should take place upon reaching specific general aviation demand *thresholds* (levels of activity), rather than a set program based solely on these forecasts.

Forecasting Methodology

Aviation demand forecasts are developed following a comprehensive review of existing sources of historical and forecast data, consideration of both aviation and socioeconomic trends, consideration of airport-related staff and user input, completion of mathematical analyses, and use of qualified professional judgment. Specific resources employed for the Greenlee County forecasting effort include:

- Interviews with the Planning Advisory Committee (PAC), airport users, and airport-related staff
- Available data on historical and current aviation activity at Greenlee County Airport
- National trends for the general aviation industry
- Pertinent socioeconomic activity data and trend information
- Existing federal, state and local forecasts
- Forecasting models

The collection, review and analysis process for the above resources resulted in the identification of specific parameters in which to prepare the Greenlee County forecasts. These parameters have been outlined in a set of forecasting guidelines and assumptions.

Forecasting Guidelines and Assumptions

The forecasting effort can take various paths depending on the specific guidelines and assumptions established for the process. Thus, the following guidelines and assumptions are defined for the Greenlee County Airport forecasting effort:

- Base year for forecasting is 2000 (where data is available)
- Existing and historical annual operations and resident (based) aircraft figures are derived from airport staff, PAC estimates and other available data sources
- Operations by type are estimated for current airport users to include general aviation, air taxi and military (where applicable)
- Operations by fleet mix are estimated for aircraft currently operating at the airport to include single engines, multi-engines, jets, and rotorcraft (where applicable)
- Peaking characteristics are based on airport estimates
- Applicable FAA Advisory Circulars, state, and local published resources are used
- The most current Department of Economic Security population statistics are used (as available during forecasting effort)
- O'Connor Field Airport located in Duncan may open during the planning period
- Potential Federal Prison development at the airport, as outlined in the previous master plan, is considered in a set of contingency demand forecasts and subsequent master planning elements

Forecasting Models

Forecasting models are used to identify historical trends as well as relationships between general aviation demand and other variables such as population and employment. Some typical forecasting models and techniques used for this purpose are described here:

- **Time Series:** This technique is the simplest and most widely used method for forecasting aviation demand. The time series technique identifies trend lines based upon historic relationships between two variables. These trend lines are extended into the future based on the assumption that events in the past will continue in the future.

- **Correlation Analyses:** Examines the direct relationship between two or more sets of historic data. Used primarily as a statistical test on several variables, this analysis detects significant relationships between sets of variables – the closer the relationship, the greater the degree of correlation. These sets of variables can then be evaluated further using several types of regression analyses.

- **Regression Analyses:** Projections of a specific aviation demand element (dependent variable) are prepared based upon its relationship to one or more other factors (independent variable) which influence aviation demand elements in question. Aircraft operations and based aircraft are examples of dependent variables, while population, per-capita income, or other socioeconomic factors are examples of independent variables.

- **Market Share Analyses:** This technique involves a review of aviation activity indicators in terms of a larger aviation market. The local share-of-the-market factor is then multiplied by forecasts of the larger total market, resulting in a projection of the local activity.

These general forecasting techniques are integrated into more specific forecasting models defined for the Greenlee County Airport. These models, used to identify or dismiss specific aviation trends and relationships, are based on the socioeconomic characteristics of the Airport Service Area.

Airport Service Area

Prior to employing any forecasting models, an airport service area must be defined to establish the geographical limits of the local general aviation demand and associated key socioeconomic activity.

An Airport Service Area boundary is typically defined by time and convenience associated with reaching other airport facilities. Factors associated with time and convenience may include mileage, prevailing highway speeds, traffic flow and attractions in the area. The National Plan of Integrated Airport Systems (NPIAS) defines a service area as "reasonable access" to facilities in 30 minutes surface travel time (also commonly called door-to-door travel time). Since Greenlee County Airport does not have scheduled commercial service, the Airport Service Area relates primarily to general aviation facilities.

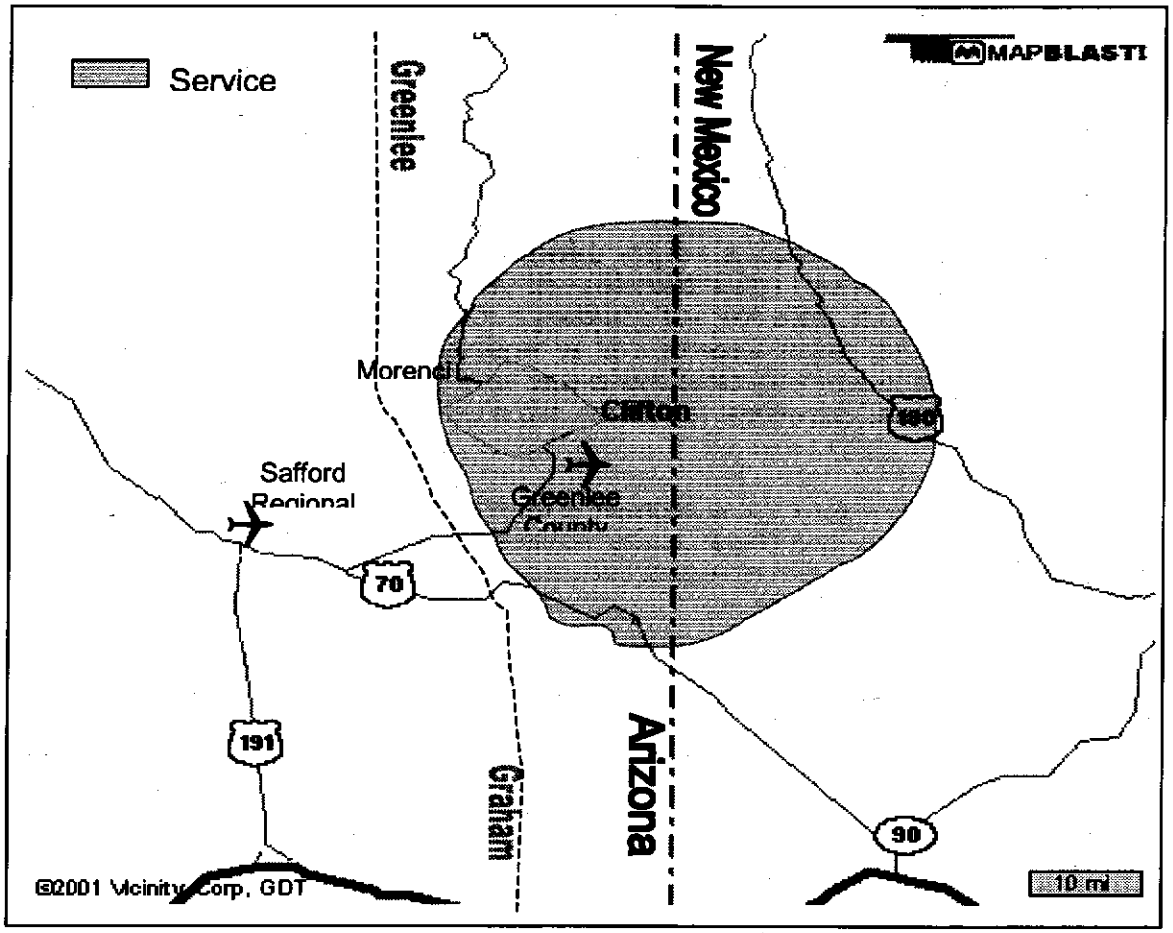
Greenlee County's airport service area boundary is identified to include the following communities: Clifton, Morenci, Duncan, and others (smaller communities within the boundary). **Exhibit 3-1** illustrates this service area, which represents more than half of Greenlee County's population and a portion of neighboring Graham County.

It should be noted that while this service area includes the Town of Duncan's O'Connor Field (closed in 1982), its planned re-opening may modify the service area for Greenlee County Airport over time depending on when and how the re-opening is phased and what level of facilities are available at both airports at the time. According to sources close to the O'Connor Field re-opening effort, there are economic development efforts under way which will support the possibe re-opening of the airport within a few years. However, there are funding issues to be resolved.

Furthermore, nearby communities with airports may overlap Greenlee County's Airport Service Area. For example, the service area used in the ADOT Aeronautics 1999 Air Service Study includes Greenlee County Airport within the service area for Safford Regional Airport (located 22 nautical miles or 50 miles westby auto). The 1999 Study described the Safford Airport service area as follows:

> *"Safford's service area does include a few small communities that do not fall within an existing service area. These communities include Morenci, Plantsite, Clifton, Gunthrie, Duncan and Franklin." (Pg. 4-5)*

Exhibit 3-1 Airport Service Area



Aviation Trends

National Aviation Trends

The U.S. aviation industry outlook for the next twelve years is for moderate to strong economic growth. Aligned with the overall industry, the General Aviation (GA) segment of the industry is expected to experience the same moderate growth (1.2% -1.5%) during the next 10 years.[1]

Since GA represents the largest aviation activity segment at Greenlee County Airport, it is important to understand this industry on a national level. GA has been influenced by a number of factors over the years to include:

- Airline deregulation in 1978
- 1981 and 1990 economic recessions
- Recent increase in recreational flying costs

[1] *Arizona State Aviation Needs Study (SANS) 2000, pg. 5-4.*

- Higher liability and taxes contributing to higher proportion of business and itinerant aircraft operations
- Changes in consumer preferences
- Increases in airspace restrictions applied to VFR aircraft

While these factors may reduce demand for general aviation aircraft and subsequently impact future growth in the general aviation fleet, this negative trend has seen a gradual upturn in recent years. As a result of recent improvements to aircraft technology, the GA fleet is anticipated to grow gradually in size, utilization, and pilot training. Recent trends noted in the Arizona State Aviation Needs Study (SANS) 2000 are stated as:

> "There is recent optimism in the general aviation industry. More sophisticated and higher value single and twin-engine aircraft are being manufactured, along with an increase in the number of advanced pilot ratings... The used aircraft market has remained strong...The global sales of GA aircraft has also increased substantially." (pg.5-4)

Furthermore, this upturn has been partially attributed to the 1994 legislation termed the "General Aviation Revitalization Act." This legislation established an 18-year product liability limit for general aviation aircraft manufacturers and consequently helped initiate restoration to this previously healthy industry.

Local and Regional Aviation Trends

Local and regional aviation trends have influenced the Greenlee County activity forecasts. It is anticipated that these trends will continue to influence aviation demand in the future. Trend information was collected through various sources including excerpts from the 1993 Airport Master Plan, State Aviation Needs Study (SANS) 2000, 1998 FAA Terminal Area Forecasts (TAF), and on-site visits and interviews.

Large Number of Itinerant Aircraft. Local operations (activity by aircraft flying in the traffic pattern or arriving and departing from local practice areas) represent about 23 percent while itinerant operations (activity with a specific destination away from the airport) represent about 77 percent of the total aircraft operations at the airport. Reflected in the current activity, approximately 33 percent are general aviation (both based and transient), approximately 65 percent of total operations are performed by air taxi/charter aircraft and over two percent are by military rotorcraft. Airport-related staff estimate that these percentage splits have generally remained consistent over the last five years.

Favorable Weather and Flying Conditions in Arizona. At Greenlee County Airport, the favorable weather and flying conditions also support the demand in general aviation aircraft year-round.

Socioeconomic Characteristics

The anticipated economic future of the Greenlee County Airport Service Area is important to help determine the probable growth in Greenlee County's aviation activity. This section briefly discusses the socioeconomic activity in the area including population, employment, and per capita income.

Population

Service Area population estimates for 1990 to 2000 are summarized in **Table 3-1**. The population has increased by a total of 976 people over the past ten years. This translates to an average annual growth rate of less than one percent while State population has consistently grown approximately three percent annually.

Table 3-1 Service Area Population History

Location	1990	1995	2000*	Average Annual Growth
Clifton	2,840	2,979	3,087	.837 %
Morenci CDP	1,799	1,846	1,890	.495 %
Duncan	662	755	816	2.11 %
Other smaller communities within the Service Area (Others)	801	806	811	.124 %
Service Area Population	6,102	6,387	6,604	.794 %

Source: Population Division, US Census Bureau March 9, 2000.
*Population Estimates.

Since Greenlee County's forecasting effort includes DES population projections, **Table 3-2** presents the Service Area population forecast through the planning period. As shown, service area population is expected to reach over 7,500 by the year 2020, an average annual growth rate of less than one percent. In comparison, population for the State is projected to increase an average of 1.8 percent -- more than double the growth rate of Greenlee County Airport's Service Area population for the same period.

Table 3-2 Service Area Population Forecasts

Year	Clifton*	Morenci*	Duncan*	Others*	Service Area Total	Avg. Annual Growth
2000	3,087	1,890	816	811	**6,604**	—
2005	3,178	1,935	857	826	**6,796**	.575 %
2010	3,278	1,993	888	854	**7,013**	.631 %
2015	3,390	2,062	916	891	**7,259**	.692 %
2020	3,507	2,133	949	927	**7,516**	.698 %

Source: Population Division, US Census Bureau March 9, 2000.
*Population Estimates.

Employment

Copper mining, solvent extraction or mineral processing, and farming continue to be the dominant economic contributors to the community. Approximately 65 percent of the jobs in

Greenlee County are in mining, which primarily includes copper mining. Phelps Dodge Corporation is one of the largest copper producers in the world and employs over 2,000 in the region. Cotton is the primary agricultural commodity and livestock also makes a substantial contribution to the farm economy. Major employers in the area include the following:

- Phelps Dodge Corporation
- Clifton, Morenci and Duncan Public Schools
- Morenci Water and Electric Company
- Greenlee County (government)
- Morenci Health Care Center
- Stockmans Bank

Recent historical employment figures for the service area are provided in **Table 3-3**. Employment has fluctuated, but increased overall at an average rate of 3.7 percent for the Airport Service Area (2.3 percent for Greenlee County) annually between 1990 and 1998.

Table 3-3 Service Area Employment History

Location	1990	1998	Avg. Annual Growth since 1990
Clifton	1,042	1,451	4.2 %
Morenci CDP	733	1,042	4.5 %
Duncan	203	157	-3.2 %
Others	NA	NA	---
Service Area Employment	1,978	2,650	3.7 %

Source: US Census Bureau, Register Analysis Branch Internet release date March 9, 2000.

Income

While Greenlee County's aviation demand is not directly driven by fluctuations in income levels, this particular factor can indirectly influence aviation demand since income represents a part of the bigger socioeconomic picture of a community. According to the Bureau of Economic Analysis, Greenlee County's most recent per capita personal income figures show steady growth. Between 1990 and 1998, per capita income increased 47.3 percent compared to the State's 40.6 percent increase. This increase resulted in a per capita income of $19,300 for 1998 – approximately 80% of the State average.

Aviation Demand Forecasts

The majority of aviation activity at Greenlee County Airport is general aviation. To properly plan any type of facility to accommodate general aviation activity at Greenlee County Airport, certain elements need to be included in the forecast. They include:

- Based Aircraft by Fleet Mix
- Annual Aircraft Operations by Type
- Peaking Characteristics
- Contingency Demand

Based Aircraft Forecasts

Historical

Greenlee County Airport does not have historical records of based aircraft. Therefore, historical based aircraft documentation is limited to past publications such as the 1993 Master Plan that identified two based aircraft for the same year. However, the small number of aircraft based at Greenlee County in the past made it simple for airport-related staff to recall the last five years, which also totaled two between 1995 and 2000.

1993 Master Plan

The 1993 Master Plan projected based aircraft to grow from two in 1993 to five in 1998 and a total of 11 in 2013. This represents a projected growth of 4½ times the base year level over a 20-year period.

1998 FAA Terminal Area Forecasts (TAF) Quick Summary

The 1998 TAF projections for Greenlee County used baseline information contained in the previous Airport Master Records (FAA Form 5010s), which identified a total of two aircraft based at the airport. The TAF projected flat growth through the planning period resulting in a consistent total of two based aircraft through 2015.

State Aviation Needs Study (SANS) 2000

Similar to the SANS 1995 forecasts, the SANS 2000 projects a flat growth rate in based aircraft for Greenlee County through 2020. However, the SANS 2000 identifies four existing based aircraft for Greenlee County and projects this same figure through the planning period.

Current Master Plan Forecast Models

Many external factors such as the aircraft types and airport facilities available at an airport influence annual aviation activity. The number of based aircraft at an airport is the most basic indicator of those aviation activities. By first developing future projections of based aircraft, the trend of other aviation demand indicators such as aircraft operations can then be projected relevant to the Greenlee County Airport.

The **Time Series Model** measured the "trend" in Greenlee County's based aircraft over the past ten years and projected a straight-line continuation of this trend into the future. A time series extrapolation of based aircraft was developed based on the period of 1990 to 2000. However, historical documentation on based aircraft is limited, but reveals zero growth over the past ten years. Therefore, this model's projections also show zero growth.

The **Correlation and Regression Analyses** established a statistical relationship (correlation) between Greenlee County Airport's based aircraft and the population of the Airport Service Area. This method projects a continuation of this relationship into the future using DES population forecasts. Utilizing the period of 1990-2000 in the regression analysis, the correlation coefficient, or r-value, was determined to be 0.87. (The correlation coefficient "r" measures the association between changes in the dependent variable (based aircraft) and independent variables). An r-value greater than 0.90 indicates good

predictive reliability. In this case, the lower value indicates low predictive reliability. Therefore, this analysis is not a viable forecasting method for Greenlee County.

While an **Employment Model** can also serve to forecast aviation demand, Greenlee County's recent employment trends have fluctuated relative to the history of based aircraft, which have been more stable. Therefore, the employment model was not considered.

The **Arizona Market Share Model** established a statistical relationship between Greenlee County Airport's based aircraft and total Arizona based aircraft and projected a continuation of this trend into the future. Total Arizona registered based aircraft (SANS 2000) is projected to increase at an average annual growth rate of 1.24 percent through the 20-year planning period. The same percentage growth rate is applied to Greenlee County Airport based aircraft with the assumption that the airport's market share will remain consistent in the future. This results in a projection of three based aircraft by 2020, up from two today.

2001 Master Plan Selected Forecast

The 2001 Master Plan uses a 1.0 percent annual growth rate to project based aircraft. This growth rate is slightly above the airport service area population growth the last ten years, but falls below the GA industry projections and the Market Share Model since the airport is in a small rural community and has experienced flat growth in aviation in its most recent years. However, the projected 1.0-percent growth anticipates that the community will begin to realize the positive impacts of economic development within the community, recent upturn dynamics of the copper industry, and the continued moderate growth of general aviation in Arizona. However, with the current based aircraft totaling two (2), a 1.0-percent annual growth rate still forecasts a total of two based aircraft at the airport by 2020, as shown in **Exhibit 3-3**. This result is consistent with current FAA and State projections, which forecast that the airport's based aircraft figures will remain consistent over the next 20 years.

It should be noted that at an annual 1.0-percent growth rate, the airport will "mathematically" reach three based aircraft by the year 2023 (just beyond the master planning period).

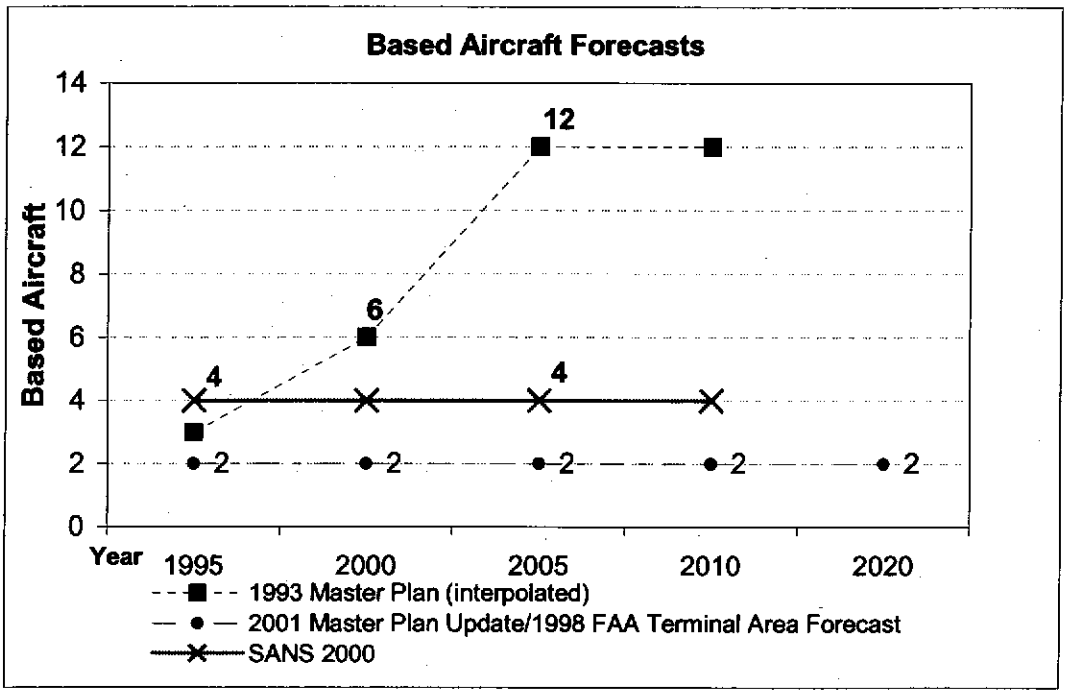
The following **Table 3-4** summarizes the existing and projected based aircraft levels for Greenlee County. As shown, the based aircraft fleet mix will remain 100 percent single engine.

Table 3-4 Selected Based Aircraft Forecasts

Year	Based Aircraft @ 100% single-engine	Average Annual % Growth
1998	2	1.0
2000	2	1.0
2005	2	1.0
2010	2	1.0
2020	2	1.0

Source: Stantec Consulting Inc.

Exhibit 3-3 Based Aircraft Activity Comparisons



Operations Forecasts

Historical

As stated earlier, the accuracy of historical and projected aviation activity records is questionable and different sources provide inconsistent data. Such inconsistencies are quite common amongst uncontrolled airports. According to airport users and staff, operations at Greenlee County Airport totaled 6,726 in 2000. Further, total annual operations in the past five years were estimated to be approximately the same. In comparison, AirNav (reflection of FAA Form 5010, Airport Master Record) dated May 22, 2000 indicates the airport averages 127 operations per week (6,604 total aircraft operations).

1993 Master Plan

The previous Airport Master Plan estimated aircraft operations at 4,320 for 1993 (base year) and projected nearly 6,000 and 9,800 operations for the future years of 1998 and 2013, respectively. This translates to 127 percent total growth over a 20-year planning period or an average annual growth rate of 4.18 percent.

State Aviation Needs Study (SANS) 2000

The SANS 2000 identifies existing and projected annual operations to remain consistent at 7,800 through 2020.

1998 FAA Terminal Area Forecasts (TAF) Quick Summary

The 1998 TAF determined the number of based single engine aircraft for Greenlee County by using information contained in the previous reported FAA Forms 5010. The TAF projected two (2) based aircraft and 6,000 total aircraft operations for Greenlee County Airport from 1998 through the year 2015.

Current Master Plan Forecast Models

Many external factors such as the aircraft types and airport facilities available at an airport influence annual aviation activity. The number of based aircraft at an airport is the most basic indicator of those aviation activities. By first developing future projections of based aircraft, the trend of other aviation demand indicators such as aircraft operations can then be projected relevant to the Greenlee County Airport.

Operations-Per-Based-Aircraft (OPBA) Analysis. Annual operations are the total number of takeoffs and landings that occur at the airport during the year. Generally, a general aviation airport similar to the size and character of Greenlee County Airport will have a broad range of activity levels, anywhere from 200 to 1,000 annual operations for every based aircraft (OPBA). The OPBA relationship between aircraft operations and based aircraft represents a quantitative "benchmark" of the average number of operations that may occur for every aircraft that utilize an airport (both based and transient). The span of aircraft operations at an airport in a rural area can vary significantly as a result of activity such as business and charter aircraft that fly in regularly rather than drive from large commercial service airports. However, for Greenlee County Airport, the OPBA ratio is approximately 3,302, which is quite a bit higher than the average 1,000 OPBA at similar general aviation airports. In this case, the OPBA will only be considered as an indicator of consistent transient aircraft operations occurring at the airport.

As mentioned previously, operations data for Greenlee County is insufficient and possibly inaccurate – a common problem amongst small rural airports. Consequently, the estimated operations data available reveals flat growth for the airport in recent years. In trend line forecasting, this same flat growth pattern is projected into the future. Application of other forecasting methods which use questionable historical data, are not considered viable forecasting models for Greenlee County. Thus, the use of existing and forecast data such as that used in a Market Share Model, or comparable growth model, are a more appropriate approach in this case.

Market Share Model. The Market Share Model used national operational levels to produce forecasts for Greenlee County. According to FAA and recent SANS 2000, the general aviation segment of the industry is expected to experience moderate growth of 1.2 to 1.5 percent during the next 10 years. Therefore, an average (midpoint) of 1.35 percent was used to project growth for Greenlee County – resulting in a total of nearly 8,800 operations by 2020. Although the Market Share Model projections represent reasonable projections for typical GA airports, Greenlee County's size, service level, rural location, and close proximity to higher service level airports has historically resulted in nearly flat growth for the airport while other GA airports have shown slightly more growth. Thus, the Market Share Model's growth projections are considered high for this community.

2001 Master Plan Selected Forecast

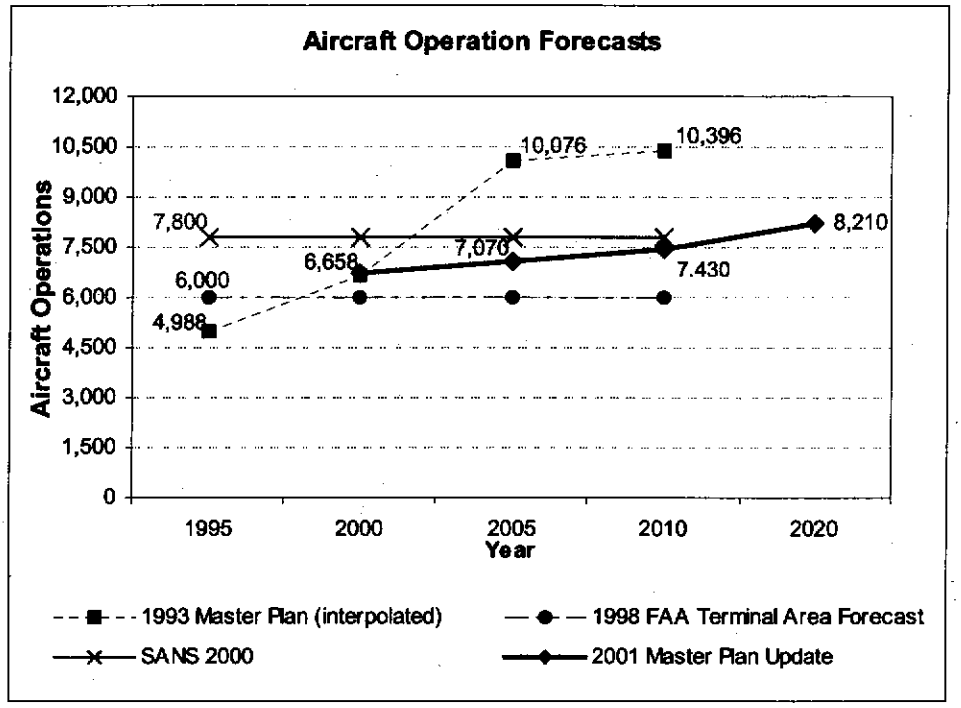
Like the based aircraft forecasting effort, the 2001 Master Plan uses a 1.0-percent annual growth rate **(see Table 3-6)** to project aircraft operations – this is above recent State and FAA projections (zero growth projected), but below the GA industry's projected growth. Since Greenlee County is a small rural airport, its projections are expected to fall below the GA industry's projections, which simply represent an average for all GA airports (large and small). While population in the Airport Service Area has seen little growth in recent years (less than 1.0 percent annually), this Master Plan projects a 1.0-percent average annual growth rate based on the same issues presented earlier for based aircraft – ongoing community economic development efforts, recent upturn dynamics of the copper industry, and the continued moderate growth of general aviation in Arizona. These issues represent the key reasons for forecasting above the no-growth projections suggested by the State and FAA forecasts shown in **Exhibit 3-4**. Further, recent discussions with the air taxi operator reveal that transient operations in the region for the copper industry and other corporate interests have already realized some moderate growth.

Table 3-6 Selected Aircraft Operations Forecasts

Year	Annual growth in %	Total Operations
2000	—	6,726
2005	1.0	7,070
2010	1.0	7,430
2020	1.0	8,210

This growth rate is more than the airport is currently experiencing and suggests that the current flat growth rate does not reflect the economic upturn for the copper industry anticipated in the next few years. It is also anticipated that continued moderate growth in the economy for Greenlee County, as well as Arizona, will be able to sustain this higher level of operational activity.

Exhibit 3-4 Aircraft Operations Activity Comparisons



Operations by Type and User

Aircraft operations are usually described in two main categories, local or itinerant. ***Local Operations*** are aircraft operating in the local traffic pattern or within sight of a tower, or aircraft known to be departing for or arriving from flight in local practice areas, or aircraft executing simulated instrument approaches at the airport. Generally, local operations can be characterized as training operations. Local operations include touch-and-go's. A touch-and-go is an operation by an aircraft that lands and departs on a runway without stopping or exiting the runway (typically conducted by training flights).

Itinerant Operations are those aircraft operating with a specific destination away from the airport. Typically, itinerant operations increase with increases in business or industrial activity. Since the airport is without a tower, an accurate breakdown of local and itinerant operations is unavailable. However, more recent estimates from AirNav (reflects FAA Form 5010 for the year 2000) and City Links were used to determine the local/itinerant percent split for Greenlee County Airport. These estimates resulted in 23 percent local (flights within a 20-mile radius) and 77 percent itinerant. This split is anticipated to generally remain consistent through 2020.

In addition to splitting operations by type (local and itinerant), operations are also defined by airport user. For Greenlee County, these users include general aviation (GA), air taxi, and military as described here.

- **General Aviation (GA)** – For Greenlee County, these operations include both local and itinerant operations defined as recreational, instructional training, firefighting, and corporate.
- **Air Taxi** – Scheduled and/or non-scheduled aircraft operations carrying passengers and/or cargo for compensation. The capacity of air taxi aircraft is limited by Part 135 of the Federal Aviation Regulations. Phelps Dodge Morenci Inc. regularly charters an air taxi service to and from New Mexico into Greenlee County .
- **Military** – Includes all operations by military aircraft. For Greenlee County, this primarily include helicopters. The Helicopter Mine Countermeasures Squadron from Corpus Christi, TX is the most frequent military user.

The following **Table 3-8** provides a summary of the local/itinerant and airport user operation splits through the planning period.

Table 3-7 Operations by Type and Airport User

	% Split	Current 2000	2005	2010	2020
LOCAL/ITINERANT OPERATIONS					
Local	23.0%	1,547	1,626	1,709	1,888
Itinerant	77.0%	5,179	5,444	5,721	6,322
TOTAL	*100.0%*	*6,726*	*7,070*	*7,430*	*8,210*
AIRPORT USER OPERATIONS					
GA Local (T&G, Practice Area)	*23.00%*	1,547	1,626	1,709	1,888
GA Itinerant (includes jets, helicopters)	*11.00%*	740	778	817	903
Air Taxi (SE/ME)	*63.70%*	4,284	4,504	4,733	5,230
Military (Helicopters)	*2.30%*	155	163	171	189
TOTAL	*100.0%*	*6,726*	*7,070*	*7,430*	*8,210*

Current airport operations are estimated at 6,726 annually and was comparable to estimates published in the current AirNav (6,604 operations) for the same year. Thus, the growth rate used to project future aircraft operations is also similar through the planning period. Furthermore, the current activity represents a 32 percent decrease over the 2000 (interpolated) annual operation estimates in the 1993 Master Plan.

Operations Fleet Mix

Based on airport staff and PAC member input, it is estimated that single-engine aircraft conduct about one-third (33.3%), multi-engine conduct about 64.2 percent, business jets less than one percent, and rotorcraft about 2.3 percent of the total aircraft operations occurring at Greenlee County Airport. Although the national aircraft fleet mix has experienced recent decreases in the percentage of single-engine piston aircraft and increases in the percentage of other high performance aircraft types, Greenlee County's fleet mix is expected to remain fairly consistent through the planning period (**Table 3-8**)

based on its current and anticipated future GA service level as well as projections by air taxi and military operators.

Table 3-8 Operations Fleet Mix Forecasts

OPERATIONS FLEET MIX	Current % Split	Current 2000	2005	2010	2020
Single-engine (95% GA Local, 75% GA Itinerant, 5% Air Taxi, 0% Military)	33.3%	2,239	2,353	2,473	2,733
Multi-engine (5% GA Local, 23% GA Itinerant, 95% Air taxi, 0% mil)	64.2%	4,318	4,539	4,770	5,270
Jets (2% GA Itinerant)	0.2%	15	16	16	18
Helicopters (100% mil)	2.3%	155	163	171	189
TOTAL	*100%*	*6,726*	*7,070*	*7,430*	*8,210*

Annual Instrument Approaches

Forecasts of annual instrument approaches provide guidance in determining future navigational aid requirements and eligibility. An instrument approach, defined by the FAA, is an approach to an airport with intent to land by an aircraft in accordance with the Instrument Flight Rule (IFR) flight plan when visibility is less than three miles and/or when the ceiling is at or below minimum initial approach altitude. Based on weather records for the Greenlee County area, a low number of occurrences of actual IFR weather conditions take place. IFR weather conditions occur approximately 2.0 percent of the time (1998-2000). However, it is estimated that actual instrument approach demand at Greenlee County Airport comprises only half of that or 1.0 percent of total operations; this translates to an estimated 67 operations per year now and 82 by the year 2020, or five to seven per month.

Peaking Characteristics

In order to determine "reasonable" planning standards to airport development, many airport facility requirements relate to the level of aviation activity during peak periods. Peaking characteristics for Greenlee County Airport consider operational characteristics at the airport and trends experienced at similar airports across the county. Three key factors are presented to describe peak demand at this airport: **peak month**, **design day** (average day of the peak month), and **design hour** (peak hour in a design day).

Peak Month

Typically, the peak month for general aviation operations approximates 10 to12 percent of the airport's annual operations. This is the calendar month when peak aircraft operations occur. For Greenlee County Airport, the peak month has been estimated at 10 percent of annual operations. The results represent **673** operations for existing activity levels and **821** for activity levels in the year 2020.

Design Day

The average day within the peak month. Normally, dividing the peak month operations derives this indicator by the number of days in the month (30 days). This translates to **22** operations for 2000 and **27** operations for 2020.

Design Hour

Design Hour operations are used to establish the peak hourly demand affecting airfield and terminal facilities. Design Hour operations will normally range from 10 to 15 percent of average day depending on the total activity. For the airport, current Design Hour operations are estimated to be approximately 10 percent of the design day operations. The Design Hour factor will tend to decrease as total activity increases. Current (2000) and Forecast (2020) peak hour operations are estimated at **two** and **three**, respectively.

The peaking characteristics of the airport are not expected to change significantly during the planning period. A summary of the peaking characteristics for Greenlee County Airport is presented in **Table 3-10**.

Table 3-9 Peaking Characteristics

Year	Annual Operations	Peak Month (10% of ops)	Design Day (Divide by 30)	Design Hour (10%)
2000	6726	673	22	2
2005	7,070	707	24	2
2010	7,430	743	25	3
2020	8,210	821	27	3

It is important to note that only the peak month is an absolute peak within a given year. All others will be exceeded at various times during the year. However, they do represent reasonable planning standards that can be applied without over-building or being too restrictive.

Contingency Demand

While the airport master planning window presents 20 years of aviation demand-driven forecasts, planning for contingencies within or beyond the 20-year planning window is critical since airport improvements should allow flexibility and serve the community well beyond 20 years. This section briefly addresses the issue of "contingency demand" surrounding the possibility of a Federal Prison development.

As presented in the previous 1993 Master Plan and increasingly discussed amongst County and Federal Prison staff members, the Federal Prison operation would consist of the arrival and departure of aircraft carrying prisoners. In order to estimate the contingency demand associated with the Federal Prison proposal, the following assumptions, in coordination with the County, were identified:

- Prisoners will arrive and depart on Boeing **727-200** or comparable aircraft
- Aircraft will *not* be based at the airport
- Aircraft will operate as a charter and not as a scheduled service

- Aircraft will arrive **twice weekly** - this translates to more than 32 additional operations per month or a total of **208 additional air taxi operations annually**
- Aircraft will primarily be transporting prisoners – number of prisoners may vary with an average of **40-60 per flight**
- Aircraft may carry **cargo** in addition to the prisoners

For Greenlee County Airport to accommodate future needs of scheduled or non-scheduled air service having 30 passengers or more, FAA Part 139—*Certification and Operations: Land Airports Serving Certain Air Carriers* guidelines must be established. Further discussion of facility requirements is included in the next chapter. Terms and definitions associated with scheduled service are included in the appendix.

Also notable is that while the airport's current and projected design aircraft in the 20-year planning period is the B-II aircraft group (see Chapter 2), a Boeing 727-200 is defined as a C-III aircraft based on its faster approach speed and wider wingspan. This primarily has implications regarding facility requirements and physical development needs addressed in subsequent chapters.

Summary

This chapter has provided forecasts for those indicators of aviation demand that are essential to the effective analysis of future facility requirements of Greenlee County Airport. The next step in the master planning process is to assess the capacity of the existing facilities and to determine the size and quantities of various aviation facilities that will be necessary to meet future aviation demand.